

Notice of Allowability

Application No.

10/701,067

Examiner

Vickey Ronesi

Applicant(s)

TORKELSON ET AL.

Art Unit

1714

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the amendment filed on 11/8/2006.
2. ☒ The allowed claim(s) is/are 1,3-8 and 18-26.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 1/16/07.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Art Unit: 1714

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with David Taylor on 1/16/2007.

The application has been amended as follows:

IN THE SPECIFICATION:

Replace the title with the following: --METHOD OF PRODUCING AN EXFOLIATED POLYMER-CLAY NANOCOMPOSITE THROUGH SOLID-STATE SHEAR PULVERIZATION—

IN THE CLAIMS:

In claim 1, line 4, insert the phrase --in a twin-screw pulverizer and-- after the phrase "exfoliating the clay through solid-state shear pulverization".

In claim 19, line 4, insert the phrase --in a twin-screw pulverizer and-- after the phrase "exfoliating the clay through solid-state shear pulverization".

Cancel claims 27 and 28.

Statement of Reasons for Allowance

The present claims are allowable over the closest prior art Gilmer et al (US 2002/0165306), Bishop et al (US 6,500,892), and Winckler et al (US 6,420,047) for the following reasons:

The present claims are drawn to a method of producing a polymer-clay nanocomposite comprising the steps of providing a polymer-clay mixture which can be melt extruded first, wherein the clay is exfoliated through solid-state shear pulverization of the mixture in a twin-screw pulverizer and in the presence of cooling sufficient to maintain the mixture in the solid state during pulverization, and discharging the mixture as a polymer-clay nanocomposite containing exfoliated clay.

Gilmer et al a polymer/clay nanocomposite containing polyamide and up to 15 wt % clay, wherein the nanocomposite is made by mixing the polymer with the intercalated clay in a melt extruder, grinding the mixture, and then extruding again to form the nanocomposite; however, Gilmer et al fails to disclose or suggest the use of a twin-screw pulverizer in the grinding step. Furthermore, while it was considered intrinsic to a grinding step that some exfoliation occurs, Gilmer et al only discloses that the clay is exfoliated via *in situ* polymerization and fails to disclose or suggest that the step of grinding in the solid-state would exfoliate the intercalated clay.

Bishop et al discloses a method of forming a polypropylene/clay nanocomposite containing up to 25 wt % clay, wherein the nanocomposite is made by mixing polypropylene and an intercalated clay in a Banbury mixer, cooling, grinding, drying, and then extruding to obtain the nanocomposite; however, Bishop et al fails to disclose or suggest the use of a twin-screw

Art Unit: 1714

pulverizer in the grinding step. Furthermore, while it was considered intrinsic to a grinding step that some exfoliation occurs, Bishop et al only discloses that exfoliation is achieved by shearing forces experience in melt blending and fails to disclose or suggest that the step of grinding in the solid-state would exfoliate the intercalated clay.

Winckler et al was relied upon to teach in the step of grinding in the presence of cooling sufficient to maintain the mixture in the solid state during pulverization, Winckler et al fails to disclose or suggest that the step of grinding in the solid-state exfoliates the intercalated clay.

Thus, it is clear that the references do not disclose or suggest the claimed invention.

In light of the above, it is clear that rejections of record are untenable and thus the present claims are passed to issue.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vickey Ronesi whose telephone number is (571) 272-2701. The examiner can normally be reached on Monday - Friday, 8:30 a.m. - 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 10/701,067

Page 5

Art Unit: 1714

1/16/2007

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